

Fairchild Semiconductor Corporation)	Departmental
Cumberland County)	Findings of Fact and Order
South Portland, Maine)	Air Emission License
A-370-71-Q-R)	

After review of the air emissions license application, staff investigation reports and other documents in the applicant's file in the Bureau of Air Quality, pursuant to 38 M.R.S.A., Section 344 and Section 590, the Department finds the following facts:

I. REGISTRATION

A. Introduction

Fairchild Semiconductor Corporation (Fairchild Semiconductor) manufactures semiconductors on silicon wafers at its site on 333 Western Avenue in South Portland, Maine.

Fairchild Semiconductor's previous license was amended three times: A-370-71-N-M established synthetic minor emission limits for the criteria pollutants and HAPs emitted by the facility; A-370-71-O-M permitted the installation of a new emergency generator #1; and A-370-71-P-M licensed the installation and operation of additional semiconductor production equipment. Changes from these amendments have been included in this license.

The maximum capacities for boilers #1, #2, #3 and #4 used in this license were taken directly off the boilerplates themselves. Fairchild Semiconductor has made some changes to their process vents and fans, therefore not all the vents listed in the previous license are considered air emission sources for the purposes of this renewal license.

Fairchild Semiconductor is not adding any major equipment that hasn't previously been licensed, therefore this license is considered to be a renewal of the Fairchild Semiconductor facility.

B. Emission Equipment

Fairchild Semiconductor is authorized to operate the following equipment. The boilers at Fairchild have misleading boilerplates; the maximum heat input capacity (MMBtu/hr) data listed on the boilerplates does not match the maximum firing rates (gal/hr) printed there. In the following chart, the boilerplate information has been included, for unit identification. Boiler emission limits have been calculated based on the maximum capacity shown in the "Calculation

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Maximum Capacity” column. The figures in this column are conservatively based on the higher of the two boilerplate entries, for each boiler. They have been rounded up to allow a further margin of error.

Fuel Burning Equipment

<u>Equipment</u>	<u>Boilerplate Information</u>	<u>Fuel Type, % sulfur</u>	<u>Calculation Maximum Capacity</u>	<u>Stack #</u>
Boiler #1	12.553 MMBtu/hr 83.5 gal/hr	#2 fuel, 0.5% sulfur or natural gas	12.6 MMBtu/hr	2
Boiler #2	20.922 MMBtu/hr 139.5 gal/hr	#2 fuel, 0.5% sulfur or natural gas	21.0 MMBtu/hr	2
Boiler #3	22.135 MMBtu/hr 148 gal/hr	#2 fuel, 0.5% sulfur or natural gas	22.2 MMBtu/hr	2
Boiler #4	21.000 MMBtu/hr 150 gal/hr	#2 fuel, 0.5% sulfur or natural gas	21.0 MMBtu/hr	2
VOC Abatement Unit	--	Natural gas Propane (back up)	3883 scf/hr 42.6 gal/hr	3

Emergency Units

<u>Equipment</u>	<u>Location</u>	<u>Max. Capacity (MMBtu/hr)</u>	<u>Firing Rate (gal/hr)</u>	<u>Fuel Type, % sulfur</u>
Fire Pump	Building 3	0.72	5.3	Diesel, 0.05%
Generator #1	Stack Yard	2.2	16.1	Diesel, 0.05%
Generator #2	Building 2	2.8	20.4	Diesel, 0.05%
Generator #3	Building 5	2.2	16.1	Diesel, 0.05%
Generator #4	Building 6	4.5	32.8	Diesel, 0.05%

Process Equipment/Emission Points

The following are process source vents. Process capacities for the vents are variable since processes are often changed within rooms.

<u>Process ID</u>	<u>Control Type</u>
Building 1	
EF 1-11 (wafer sort)	N/A
EF 2-1	Wet scrubber
EF 2-1 A	Wet scrubber
EF 2-2	N/A
EF 2-3	N/A
EF 2-15	N/A
EF 2-18 A & B	N/A

<u>Process ID</u>	<u>Control Type</u>
Building 5	
EF 5-10 A & B	N/A
EF 5-11	Fabric filter
EF 5-13	Wet scrubber
EF 5-14	Wet scrubber
EF 5-21	N/A
EF 5-22	N/A
EF 5-24/25	N/A

EF 2-20	N/A
EF 2-23	N/A
EF 2-25	N/A
EF 2-31 A & B	N/A
EF 2-45 A & B	Wet scrubber
EF 2-50	N/A
EF 2-51	N/A
EF 2-54	N/A
EF 2-58	N/A
EF 2-62(antimony trioxide)	Fabric filter
EF 2-63	N/A
EF 2-66 A & B	N/A
Building 4	
EF 4-1	Wet scrubber
EF 4-2	N/A
EF 4-4 (arsenic trioxide)	Fabric filter

EF 5-33 A & B	Wet scrubber
Building 12	
EF 10-3	N/A
EF 12-209	Wet scrubber
EF 12-302	N/A
EF 12-322	N/A
EF 12-329	Wet scrubber
EF 12-330	VOC incineration
EF 12-331 (bead blast)	Fabric filter
EF 12-332 (bead blast)	Fabric filter
EF 12- 335	
EF 12-336 (flame spray)	Fabric filter
EF 12-337	N/A
Building 17	
EF 17-101/103	Wet scrubber
EF 17-102	Wet scrubber
EF 17-104	N/A
EF17A-67 A & B	N/A

Fairchild Semiconductor operates a solvent degreaser at their facility.

Fairchild Semiconductor also has insignificant activities, including but not limited to storage tanks (fuel oil, liquid hydrogen, liquid nitrogen, liquid argon) and natural gas fired burn boxes.

C. Application Classification

The application for Fairchild Semiconductor does not include the licensing of increased emissions or the installation of new or modified equipment. Therefore, the license is considered to be a renewal of current licensed emission units only.

II. BEST PRACTICAL TREATMENT (BPT)

A. Introduction

In order to receive a license the applicant must control emissions from each unit to a level considered by the Department to represent Best Practical Treatment (BPT), as defined in Chapter 100 of the Department regulations. Separate control requirement categories exist for new and existing equipment as well as for those sources located in designated non-attainment areas.

BPT for existing emissions equipment means that method which controls or reduces emissions to the lowest possible level considering:

- the existing state of technology;
- the effectiveness of available alternatives for reducing emission from the source being considered; and
- the economic feasibility for the type of establishment involved.

Process Description

Fairchild Semiconductor manufactures semiconductors on silicon wafers. Each type and size of semiconductor manufactured goes through the same general process steps, but the complexity and structural makeup of the products are different. Oxide and metallic layers are built up on the blank wafers using various chemical or process parameters to produce layers at the required specifications. The manufacturing processes include repeated batch operation steps such as pre-cleaning, doping, photo mask development, etching, backgrinding and cleaning.

The wafers are first pre-cleaned with chemicals in cleaning tanks for a specified period of time. After each cleaning tank, the wafers are rinsed with de-ionized water. Following the pre-cleaning steps, the wafers are sent to diffusion furnaces where the initial layer of oxide is grown on the wafer. Depending on the stage of the oxide layer growth, layer number or product type, the operating parameters may vary significantly. The introduction of impurities (doping) may occur in the diffusion chambers if required.

After oxidation, the wafers are placed on photo resist coating equipment. The wafers are dried, then photoresist (a light sensitive chemical) is applied. The wafers are baked and exposed to a light beam shot through a mask containing the desired network configuration. After exposure, the wafers are developed using a photoresist fixer. The network configuration has now been copied onto the wafer and serves as a pattern for the next step in the process.

Before etching, some wafers are sent to the ion implanting area. Impurities are deposited into the layer(s) using a high-speed particle accelerator. Etching removes the oxide which was not fixed in the development stage. Either a gas or liquid chemical process is used for this removal. After etching the remaining photoresist on top of the fixed portion of the wafer is stripped with sulfuric acid/hydrogen peroxide mix or carbon tetrafluoride and oxygen.

After the required layers are formed, the wafers are transferred to another room where the back side of the disk is ground down to specifications. At this point, the wafers are packaged and shipped to another Fairchild plant for testing and assembly into the finished product.

B. Boilers #1, #2, #3 and #4

Boilers #1, #2, #3 and #4 were manufactured in 1982, 1980, 1966 and 1966, respectively, with maximum heat input capacities of 12.553, 20.922, 22.135 and

21.000 MMBtu/hr, according to the boilerplates information. The boilers fire 0.5% sulfur #2 fuel oil or natural gas. They are therefore not subject to EPA New Source Performance Standards (NSPS) Subpart Dc for boilers with heat inputs of 10 MMBtu/hr or greater and manufactured after June 9, 1989.

BPT for boilers #1, #2, #3 and #4 is the following:

1. The firing of 0.5% sulfur #2 fuel oil or natural gas.
2. For the firing of #2 fuel oil:
 - (i) PM emission limits are based on previously modeled emission limits and are regulated by MEDEP Chapter 103 for oil fired boilers greater than 3 MMBtu/hr. PM₁₀ limits are derived from the PM calculations.
 - (ii) NO_x emission limits are based on data for boilers of similar size and age and firing #2 fuel.
 - (iii) CO and VOC emission limits are based on previously modeled emission limits.
3. For the firing of natural gas, PM, SO₂, NO_x, CO and VOC emission limits are based on AP-42 data dated 7/98 for boilers firing natural gas.
4. Visible emissions from boilers #1, #2, #3 and #4 (stack 2) shall not exceed 20% opacity on a 6-minute block average, except for no more than 3 six-minute block averages in a 3-hour block period.

C. Emergency Units

Fairchild Semiconductor operates four emergency generators (units 1, 2, 3 and 4) and a fire pump. The firing rates range between 12.4 gal/hr and 32.8 gal/hr. Each unit is limited to 500 hours of operation per 12-month rolling year.

BPT for the emergency units is the following:

1. The firing of 0.05% sulfur fuel oil.
2. 500 hours of operation for each unit per 12-month rolling year.
3. PM emission limits for emergency generator #4 are regulated by MEDEP Chapter 103 for oil fired units greater than 3 MMBtu/hr. PM emission limits for emergency generators #1, #2 and #3 and the emergency pump are based upon AP-42 data dated 10/96 for fuel oil fired internal combustion engines of less than 600 horsepower. PM₁₀ limits are derived from the PM calculations.
4. SO₂, NO_x, CO and VOC emission limits are based upon AP-42 data dated 10/96 for fuel oil fired internal combustion engines of less than 600 horsepower.
5. Visible emissions from each of emergency generator #1, #2, #3 and #4 and the emergency fire pump shall not exceed 30% opacity on a 6-minute block average, except for no more than 2 six-minute block averages in a 3-hour period.

D. Particulate Emission Processes

Some of the processes at Fairchild Semiconductor emit particulate matter. The processes include bead blasting for parts cleaning and aluminum flame spraying. These process vents are controlled by fabric filters. The collected particulate includes oxides of antimony, silicon, aluminum, titanium, platinum and gold.

BPT for vents EF 2-62 (antimony trioxide), EF 4-4 (arsenic trioxide), EF 5-11 (plant vacuum cleaner system), EF 12-331 and EF 12-332 (bead blast) and EF 12-336 (flame spray) includes the use of fabric filters to control particulate matter. A maintenance log shall be kept for each of the filters. The logs shall contain descriptions of any maintenance, routine or otherwise, performed on the filters. Visible emissions from each of the fabric filters shall not exceed 10% opacity on a six minute block average basis, except for no more than one 6-minute block average in a 1-hour period. Fairchild Semiconductor shall take corrective action if visible emissions from the baghouse exceed 5% opacity.

E. Uncontrolled Process Vents

Visible emissions from each uncontrolled process vent shall not exceed 10% opacity on a 6-minute block average basis, except for no more than one 6-minute block average in a 1-hour period.

F. Solvent Degreaser

The Solvent Degreaser located at Fairchild Semiconductor is subject to MEDEP Chapter 130 and the operational standards of the chapter.

G. VOC Processes and Abatement Unit

Fairchild Semiconductor has various process operations that emit VOCs. Due to product specifications and manufacturing needs, the amount of VOC emitted from a specific vent can vary. Fairchild Semiconductor has installed a VOC abatement unit to control VOCs from many of the main VOC emitting vents.

The VOC abatement unit consists of a zeolite concentrator followed by an incineration unit with a 4 MMBtu/hr natural gas burner (propane back-up.) The unit is exhausted through its own stack. The unit shall be maintained and operated to meet a minimum treatment efficiency of 90% removal. The removal efficiency shall be calculated as follows:

$$\frac{(VOCs \text{ at inlet to concentrator}) - (VOCs \text{ after incineration})}{(VOCs \text{ at inlet to concentrator})} \times 100\%$$

Testing shall be performed annually (by December 1 of each year) on the inlet and outlet streams.

The following parameters shall be monitored on the unit: combustion temperature and alarms that indicate the status of the concentrator's rotor and the status of the

fans located in the process vents. The unit operates within a temperature range of 1350°F - 1500°F. When the monitored temperature is not within the normal operating range, the unit shuts down. Fairchild Semiconductor shall keep records of events when the unit shuts down and events when the alarms are activated. The records shall include the time that the unit is not operating. These records shall be incorporated into the emissions calculations since the VOCs vent to the atmosphere when the unit is not operating. Fairchild Semiconductor shall have 97% uptime on the VOC incinerator when the wafer process is in operation.

All of the VOCs from Building 17 are collected and incinerated in the VOC Abatement Unit. Most of the emissions from activities in Buildings 1, 2 and 5 are high volume, low concentration. The lower volume, higher concentration emissions from these three buildings are collected and abated in the VOC incinerator. The remaining balance is vented to the atmosphere. The lower volume/higher concentration emissions account for approximately 80% of all VOC emissions from the activities in buildings 1, 2 and 5. Building 12 (leased from National Semiconductor) contains the same type of VOC emissions and approximately 90% of the VOCs generated in building 12 by Fairchild Semiconductor are collected and incinerated by Fairchild.

Fairchild Semiconductor shall be limited to 25 tons/year of process VOCs on a 12-month rolling total basis. In order to show compliance, Fairchild Semiconductor shall use mass balance calculations and control efficiencies to calculate emissions. For each month during the year, Fairchild Semiconductor shall continue to compute emissions for the previous 12 months. The emissions shall be estimated according to the equations below.

For VOCs from insignificant activities, Fairchild Semiconductor shall maintain in its files an estimate of the VOCs emitted annually from such activities, to the extent that the VOC emissions are not included in the 12 month rolling average recordkeeping program. The estimate shall be updated annually if process or raw material changes have occurred that would effect the previous estimate.

Fairchild Semiconductor has purchase records which are presently maintained weekly. A system has been set up which associates the distribution of the solvents to either an uncontrolled process area (VOC emitted directly or fugitively to the atmosphere) or to a controlled process area (VOC abatement unit). When the wafer process is in operation and the VOC abatement unit is not operating, the emissions from the normally controlled area shall be considered uncontrolled in the VOC emission calculations. The spent solvent records are compiled using the mass and volume of spent solvents shipped off-site, as well as test results of the VOC content of the mixed solvents.

- (1) VOC purchased and used in Uncontrolled Process Area - Spent VOC Collected from Uncontrolled Process Area = Uncontrolled VOC emitted from the Facility
- (2) VOC purchased and used in Controlled Process Area - Spent VOC Collected from Controlled Process Area = VOC Conveyed to the Control Device
- (3) VOC Conveyed to Control Device * (1 - Control Efficiency) = VOC Emitted from the Control Device
- (4) Uncontrolled VOC emitted from the Facility + VOC Emitted from the Control Device = Total VOC Emissions

A simplified example using these equations to calculate emissions for a 12 month period follows:

VOC purchased and used in uncontrolled process area	90,000 lb	
Spent VOC collected from uncontrolled process area	<u>-53,000 lb</u>	
Uncontrolled VOC emitted from the facility	37,000 lb	(1)
VOC purchased and used in controlled process area	68,000 lb	
Spent VOC collected from controlled process area	<u>-24,425 lb</u>	
VOC conveyed to control device	43,575 lb	(2)
VOC conveyed to control device	43,575 lb	(2)
Control efficiency of abatement unit	93%	
VOC emitted from the control device	3,050 lb	(3) = (43,575) * (1 - .93)
Uncontrolled VOC emitted from the facility	<u>+37,000 lb</u>	(1)
Total actual VOC emissions	40,050 lb	(4) = (3) + (1)

BPT for the VOCs emitted from the processes at Fairchild Semiconductor shall be a limit of 25 tons/year, based on a 12-month rolling total. Visible emissions from the VOC Abatement Unit shall not exceed 10% opacity on a 6-minute block average basis, except for no more than one 6-minute block average in a 1-hour period.. Visible emissions from VOC venting directly to the atmosphere shall not exceed 10% opacity on a 6-minute block average basis, except for no more than one 6-minute block average in a 1-hour period.

H. HAP (Hazardous Air Pollutant) Processes

Some of the VOCs emitted by Fairchild Semiconductor contain HAPs (HAPs means those substances listed in Section 112(b) of the Clean Air Act). In order to meet BPT and keep the facility under the major source thresholds, Fairchild Semiconductor shall be limited to emissions of 9.9 tons/year of any single HAP and less than 24.9 tons/year total of all HAPs. Recordkeeping shall be done on a monthly basis documenting compliance with these 12 month rolling total limits.

The monthly recordkeeping for HAPs may be directly correlated to the VOC recordkeeping and the formula given above for VOC emission calculations. Fairchild Semiconductor shall keep a 12-month rolling total for each HAP emitted

and total facility HAPs emitted based on purchase records, MSDS for the various materials used by the facility, and whether the HAP is controlled before being emitted to the atmosphere.

I. Acid and Alkaline Emission Sources

Fairchild Semiconductor has several acid and alkaline emission points. These are controlled by alkaline and acidic wet scrubbers. The pH of the scrubbing media shall be used as a control parameter and shall be monitored and adjusted as appropriate. The pH of the acid vapor scrubbing media shall be maintained at or above 8; the pH of the alkaline vapor scrubbing media shall be maintained at or below 5. The pH shall be checked and recorded once per shift.

BPT for the acid and alkaline emission points is the use of wet scrubbers, monitored using pH. Visible emissions from each scrubber stack shall not exceed 20% opacity on a 6-minute block average basis, except for no more than one 6-minute block average in a 1-hour period.

J. Facility Emissions

To maximize operational flexibility and Fairchild Semiconductor's ability to respond to changes in fuel market conditions and to ensure that the South Portland plant remains below the Part 70 major source threshold, Fairchild Semiconductor shall be limited facility-wide to 99.9 TPY of PM, SO₂, NO_x and CO using the fuel equations below. Based on short-term emission limits, if SO₂, NO_x and CO are under 99.9 tons/year, PM is also under 99.9 tons/year. Fairchild Semiconductor shall use #2 fuel oil with a maximum sulfur content of 0.5% by weight or natural gas in its boilers and fuel oil with a maximum sulfur content of 0.05% by weight in its emergency generators and fire pump. VOCs shall be limited to 25 tons/year from process sources and 15 tons/year from fuel burning sources. Based on short term emission limits, if SO₂, NO_x and CO are under 99.9 tons/year, VOC from fuel burning sources will also be under 15 tons/year.

The following equations shall be used to determine the 12-month rolling totals:

$$\begin{aligned} \text{SO}_2 \\ \frac{\text{tons SO}_2}{\text{year}} = \frac{\text{tons gen SO}_2}{\text{year}} + \frac{\left(\frac{\text{lb S}}{\text{MMBtu \#2 fuel}} \right) \left(\frac{2 \text{ lb SO}_2}{1 \text{ lb S}} \right) \left(\frac{\text{MMBtu}}{\text{gal \#2}} \right) \left(\frac{\text{gal \#2}}{\text{year}} \right) + \left(\frac{\text{lb SO}_2}{\text{scf NG}} \right) \left(\frac{\text{scf NG}}{\text{year}} \right)}{2000 \frac{\text{lb}}{\text{ton}}} \\ \frac{\text{tons SO}_2}{\text{year}} = AD + \frac{[(0.141y)(s_2) + (0.0000006z)]}{2000} \leq 99.9 \text{ tons / year} \end{aligned}$$

where:

AD = annual quantity (tons) of SO₂ from the operation of all generators = sum of [(total hours of operation)(lb/hr limit)]/2000 for each unit;
y = annual quantity of #2 oil combusted (gallons) facility wide;
s₂ = average sulfur content by weight of #2 oil (percent);
z = annual quantity of natural gas combusted (cubic feet) facility wide.

NO_x

$$\frac{\text{tons } NO_x}{\text{year}} = \frac{\text{tons gen } NO_x}{\text{year}} + \frac{\left(\frac{0.3 \text{ lb } NO_x}{\text{MMBtu \#2}} \right) \left(\frac{\text{MMBtu \#2}}{\text{gal \#2}} \right) \left(\frac{\text{gal \#2}}{\text{year}} \right) + \left(\frac{\text{lb } NO_x}{\text{MMBtu NG}} \right) \left(\frac{\text{MMBtu NG}}{\text{scf NG}} \right) \left(\frac{\text{scf NG}}{\text{year}} \right)}{2000 \frac{\text{lb}}{\text{ton}}}$$

$$\frac{\text{tons } NO_x}{\text{year}} = AD + \frac{[(0.042y) + (0.0000721z)]}{2000} \leq 99.9 \text{ tons / year}$$

where:

AD = annual quantity (tons) of NO_x from the operation of all generators = sum of [(total hours of operation)(lb/hr limit)]/2000 for each unit;
y = annual quantity of #2 oil combusted (gallons) in boilers;
z = annual quantity of natural gas combusted (cubic feet) in boilers.

CO

$$\frac{\text{tons CO}}{\text{year}} = \frac{\text{tons gen CO}}{\text{year}} + \frac{\left(\frac{\text{lb CO}}{\text{gal \#2}} \right) \left(\frac{\text{gal \#2}}{\text{year}} \right) + \left(\frac{\text{lb CO}}{\text{scf NG}} \right) \left(\frac{\text{scf NG}}{\text{year}} \right)}{2000 \frac{\text{lb}}{\text{ton}}}$$

$$\frac{\text{ton CO}}{\text{year}} = AD + \frac{[(0.005y) + (0.000084z)]}{2000} \leq 99.9 \text{ tons / year}$$

where:

AD = annual quantity (tons) of CO from the operation of all generators = sum of [(total hours of operation)(lb/hr limit)]/2000 for each unit;
y = annual quantity of #2 oil combusted (gallons) in total facility;
z = annual quantity of natural gas combusted (cubic feet) in total facility.

The following shall not be exceeded on a 12-month rolling total:

Total Allowable Annual Emission for the Facility
(used to calculate the annual license fee)

<u>Pollutant</u>	<u>Tons/Year</u>
PM	99.9
PM ₁₀	99.9
SO ₂	99.9
NO _x	99.9
CO	99.9
VOC*	25 process equipment; 15 fuel burning

*HAP emissions shall not exceed 9.9 tons/year
for any single HAP or 24.9 tons/yr total HAP.

III.AMBIENT AIR QUALITY ANALYSIS

According to the Maine Regulations Chapter 115, the level of air quality analyses required for a renewal source shall be determined on a case-by case basis. Fairchild Semiconductor submitted a modeling analysis with their last renewal license. Since this renewal does not include the licensing of increased emissions or the installation of new or modified equipment, and licensed allowed emissions are not increasing, Fairchild Semiconductor is not required to submit further modeling.

ORDER

Based on the above Findings and subject to conditions listed below, the Department concludes that the emissions from this source:

- will receive Best Practical Treatment,
- will not violate applicable emission standards,
- will not violate applicable ambient air quality standards in conjunction with emissions from other sources.

The Department hereby grants Air Emission License A-370-71-Q-R subject to the following conditions:

STANDARD CONDITIONS

- (1) Employees and authorized representatives of the Department shall be allowed access to the licensee's premises during business hours, or any time during which any emissions units are in operation, and at such other times as the Department deems necessary for the purpose of performing tests, collecting samples, conducting inspections, or examining and copying records relating to emissions (Title 38 MRSA §347-C).
- (2) The licensee shall acquire a new or amended air emission license prior to commencing construction of a modification, unless specifically provided for in Chapter 115.

- (3) Approval to construct shall become invalid if the source has not commenced construction within eighteen (18) months after receipt of such approval or if construction is discontinued for a period of eighteen (18) months or more. The Department may extend this time period upon a satisfactory showing that an extension is justified, but may condition such extension upon a review of either the control technology analysis or the ambient air quality standards analysis, or both.
- (4) The licensee shall establish and maintain a continuing program of best management practices for suppression of fugitive particulate matter during any period of construction, reconstruction, or operation which may result in fugitive dust, and shall submit a description of the program to the Department upon request.
- (5) The licensee shall pay the annual air emission license fee to the Department, calculated pursuant to Title 38 M.R.S.A. §353.
- (6) The license does not convey any property rights of any sort, or any exclusive privilege.
- (7) The licensee shall maintain and operate all emission units and air pollution systems required by the air emission license in a manner consistent with good air pollution control practice for minimizing emissions.
- (8) The licensee shall maintain sufficient records to accurately document compliance with emission standards and license conditions and shall maintain such records for a minimum of six (6) years. The records shall be submitted to the Department upon written request.
- (9) The licensee shall comply with all terms and conditions of the air emission license. The filing of an appeal by the licensee, the notification of planned changes or anticipated noncompliance by the licensee, or the filing of an application by the licensee for a renewal of a license or amendment shall not stay any condition of the license.
- (10) The licensee may not use as a defense in an enforcement action that the disruption, cessation, or reduction of licensed operations would have been necessary in order to maintain compliance with the conditions of the air emission license.
- (11) In accordance with the Department's air emission compliance test protocol and 40 CFR Part 60 or other method approved or required by the Department, the licensee shall:

- (i) perform stack testing to demonstrate compliance with the applicable emission standards under circumstances representative of the facility's normal process and operating conditions:
 - (a) within sixty (60) calendar days of receipt of a notification to test from the Department or EPA, if visible emissions, equipment operating parameters, staff inspection, air monitoring or other cause indicate to the Department that equipment may be operating out of compliance with emission standards or license conditions; or
 - (b) pursuant to any other requirement of this license to perform stack testing.
 - (ii) install or make provisions to install test ports that meet the criteria of 40 CFR Part 60, Appendix A, and test platforms, if necessary, and other accommodations necessary to allow emission testing; and
 - (iii) submit a written report to the Department within thirty (30) days from date of test completion.
- (12) If the results of a stack test performed under circumstances representative of the facility's normal process and operating conditions indicate emissions in excess of the applicable standards, then:
 - (i) within thirty (30) days following receipt of such test results, the licensee shall re-test the non-complying emission source under circumstances representative of the facility's normal process and operating conditions and in accordance with the Department's air emission compliance test protocol and 40 CFR Part 60 or other method approved or required by the Department; and
 - (ii) the days of violation shall be presumed to include the date of stack test and each and every day of operation thereafter until compliance is demonstrated under normal and representative process and operating conditions, except to the extent that the facility can prove to the satisfaction of the Department that there were intervening days during which no violation occurred or that the violation was not continuing in nature; and
 - (iii) the licensee may, upon the approval of the Department following the successful demonstration of compliance at alternative load conditions, operate under such alternative load conditions on an interim basis prior to a demonstration of compliance under normal and representative process and operating conditions.
- (13) Notwithstanding any other provisions in the State Implementation Plan approved by the EPA or Section 114(a) of the CAA, any credible evidence may be used for the purpose of establishing whether a person has violated or is in violation of any statute, regulation, or Part 70 license requirement.

- (14) The licensee shall maintain records of malfunctions, failures, downtime, and any other similar change in operation of air pollution control systems or the emissions unit itself that would affect emission and that is not consistent with the terms and conditions of the air emission license. The licensee shall notify the Department within two (2) days or the next state working day, whichever is later, of such occasions where such changes result in an increase of emissions. The licensee shall report all excess emissions in the units of the applicable emission limitation.
- (15) Upon written request from the Department, the licensee shall establish and maintain such records, make such reports, install, use and maintain such monitoring equipment, sample such emissions (in accordance with such methods, at such locations, at such intervals, and in such a manner as the Department shall prescribe), and provide other information as the Department may reasonably require to determine the licensee's compliance status.

SPECIFIC CONDITIONS

- (16) Boilers
- (i) Boilers #1, #2, #3 and #4 shall #2 fuel oil with a maximum sulfur content of 0.5% by weight, or natural gas.
 - (ii) Fairchild Semiconductor shall maintain a log of monthly fuel use records. Fuel receipts from the supplier shall be kept to certify the sulfur content of the oil. Fuel use records shall be kept for a minimum of 6 years.
 - (iii) Emissions from the boilers shall not exceed the following limits:

Boiler Emission Limits

Equipment		PM	PM₁₀	SO₂	NO_x	CO	VOC
Boiler #1 (#2 fuel)	lb/MMBtu	0.1	--	--	--	--	--
	lb/hr	1.3	1.3	6.4	3.8	0.45	0.02
Boiler #1 (nat'l gas)	lb/MMBtu	0.01	--	--	--	--	--
	lb/hour	0.13	0.13	0.01	1.24	1.04	0.07
Boiler #2 (#2 fuel)	lb/MMBtu	0.1	--	--	--	--	--
	lb/hr	2.1	2.1	10.6	6.3	0.75	0.03
Boiler #2 (nat'l gas)	lb/MMBtu	0.01	--	--	--	--	--
	lb/hour	0.21	0.21	0.02	2.06	1.73	0.12
Boiler #3 (#2 fuel)	lb/MMBtu	0.1	--	--	0.3	--	--
	lb/hr	2.3	2.3	11.2	6.7	0.8	0.04
Boiler #3 (nat'l gas)	lb/MMBtu	0.01	--	--	--	--	--
	lb/hour	0.22	0.22	0.02	2.18	1.83	0.12
Boiler #4 (#2 fuel)	lb/MMBtu	0.1	--	--	--	--	--
	lb/hr	2.1	2.1	10.6	6.3	0.75	0.03
Boiler #4 (nat'l gas)	lb/MMBtu	0.01	--	--	--	--	--
	lb/hour	0.21	0.21	0.02	2.06	1.73	0.12

Compliance shall be demonstrated upon request of the Department through stack testing in accordance with the appropriate method found in 40 CFR Part 60, Appendix A.

- (iv) Visible emissions from the boilers' common stack (stack 2) shall not exceed 20% opacity on a 6-minute block average basis, except for no more than three 6-minute block averages in a 3-hour block period.
- (17) Emergency Units
- (i) Emergency generators #1, #2, #3 and #4 and the emergency fire pump shall each be limited to 500 hours of operation per 12-month rolling year.
- (ii) Hour meters shall be installed and operated on each of the emergency units. Fairchild Semiconductor shall maintain records of the hourly operation of each of the emergency units on a 12-month rolling total basis. These records shall also include the dates, times and reason for operation each time an emergency unit operates. Fuel receipts from the fuel supplier certifying the sulfur content of the oil shall be kept for a minimum of 6 years.
- (iii) The fuel oil shall be limited to a maximum sulfur content of 0.05%.
- (iv) Emissions from the emergency units are limited to the following:

Emergency Unit Emission Limits

Unit		PM	PM ₁₀	SO ₂	NO _x	CO	VOC
Fire pump	lb/hr	0.23	0.23	0.04	3.2	0.7	0.25
Generator #1	lb/hr	0.7	0.7	0.12	9.7	2.1	0.8
Generator #2	lb/hr	0.87	0.87	0.14	12.3	2.7	0.98
Generator #3	lb/hr	0.7	0.7	0.12	9.7	2.1	0.8
Generator #4	lb/MMBtu	0.12	0.12	--	--	--	--
	lb/hr	0.54	0.54	0.23	19.8	4.3	1.6

- (v) Visible emissions from each of emergency generator #1, #2, #3 and #4 and the emergency fire pump shall not exceed 30% opacity on a 6-minute block average basis, except for no more than two 6-minute block averages in a 3-hour period.
- (18) Particulate Emission Processes
- (i) Particulate matter emissions from vents EF 2-62, EF 4-4, EF 12-331 (bead blast), EF 12-332 (bead blast), and EF 12-336 (flame spray), shall be controlled by the use of fabric filters.
- (ii) A maintenance log shall be kept for each of the fabric filters. The logs shall contain dates and reasons for all emission upsets as well as descriptions and dates of any maintenance, routine or otherwise, performed on the filters.

- (iii) Visible emissions from the fabric filters shall not exceed 10% opacity on a 6-minute block average basis, except for no more than one 6-minute block average in a 1-hour period. Fairchild Semiconductor shall take corrective action if visible emissions from the fabric filters exceed 5% opacity. Such events and the actions taken shall be recorded in the maintenance log.

(19) **Parts Degreaser**

Parts Degreasers at Fairchild Semiconductor are subject to MEDEP Chapter 130, including record-keeping, certification, and operational standards, which are summarized below. See Chapter 130 for complete requirements.

- (i) Close the covers on all solvent degreasing tanks when the tanks are not in use.
- (ii) Drain the cleaned parts for at least fifteen (15) seconds or until dripping stops.
- (iii) If used, supply a solvent spray that is a solid fluid stream (not a fine, atomized or shower-type spray) at a pressure that does not exceed ten (10) pounds per square inch gauge pressure (psig).
- (iv) Do not degrease porous or absorbent materials, such as cloth, leather, wood or rope.
- (v) Minimize drafts to less than 40 meters/minute.
- (vi) Refrain from operating the cold cleaning degreaser upon the occurrence of any visible solvent leak until such leak is repaired.
- (vii) Refrain from using any halogenated solvents in the degreasing tanks.

(20) **Uncontrolled Process Vents**

Visible emissions from each uncontrolled process vent shall not exceed 20% opacity on a 6-minute block average basis, except for no more than one 6-minute block average in a 1-hour period.

(21) **VOC Process and Abatement Unit**

- (i) Facility-wide process VOC emissions shall be limited to 25 tons/year, based on a 12-month rolling total.
- (ii) Fairchild Semiconductor shall maintain and operate the VOC abatement unit that controls VOC emissions from some of the main process vents. The abatement unit shall have an efficiency of 90%.
- (iii) Testing shall be performed annually (by December 1 of each year) on the inlet stream prior to the concentrator and the outlet stream of the VOC abatement unit, to demonstrate 90% removal efficiency. Testing shall be conducted in accordance with EPA Method 25A. Removal efficiency of the VOC abatement unit shall be calculated as follows:

$$\frac{(VOCs \text{ at inlet to concentrator}) - (VOCs \text{ after incineration})}{(VOCs \text{ at inlet to concentrator})} \times 100\%$$

- (iv) The following shall be monitored and recorded for the VOC abatement unit:
 - (a) combustion temperature (parameter monitor – See Condition (24));
 - (b) alarms that indicate the concentrator rotor is not rotating; and,
 - (c) alarms indicating that the process vent fans are not operating.Fairchild Semiconductor shall keep records of events when the unit shuts down, including automatic shut-off events when the unit deviates from its normal operating temperature range of 1350°F - 1500°F, and events when the alarms are activated. The records shall include the time that the unit is not operating.
- (v) Fairchild Semiconductor shall have 97% uptime on the VOC incinerator when the wafer process is in operation.
- (vi) Fairchild Semiconductor shall keep a maintenance log recording the date and reasons for all emission upsets as well as all routine maintenance procedures.
- (vii) Visible emissions from the VOC abatement unit shall not exceed 10% opacity on a 6-minute block average basis, except for no more than one 6-minute block average in a 1-hour period.
- (viii) Visible emissions from vents emitting VOCs directly to the atmosphere shall not exceed 10% opacity on a 6-minute block average basis, except for no more than one 6-minute block average in a 1-hour period.
- (ix) Total VOC process emissions at Fairchild Semiconductor shall be calculated on a 12-month rolling total (the first 12 month period having been June 1, 1997 to May 31, 1998), updated monthly, using the following equations:
 - (1) VOC purchased and used in Uncontrolled Process Area - Spent VOC Collected from Uncontrolled Process Area = Uncontrolled VOC emitted from the Facility
 - (2) VOC purchased and used in Controlled Process Area - Spent VOC Collected from Controlled Process Area = VOC Conveyed to the Control Device
 - (3) VOC Conveyed to Control Device * (1 - Control Efficiency) = VOC Emitted from the Control Device
 - (4) Uncontrolled VOC emitted from the Facility + VOC Emitted from the Control Device = Total VOC Emissions

When the wafer process is operating and the VOC abatement unit is not operating, the emissions from the normally controlled area shall be considered uncontrolled in the VOC emission calculations.

For VOCs from insignificant activities, Fairchild Semiconductor shall maintain in its files an estimate of the VOCs emitted annually from such activities, to the extent that the VOC emissions are not included in the 12 month rolling average record keeping program. The estimate shall be

updated annually if process or raw material changes have occurred that would effect the previous estimate.

(22) HAP Processes

- (i) Fairchild Semiconductor shall be limited to 9.9 tons/year of any single HAP and 24.9 tons/year of total facility HAPs, based on a 12 month rolling total.
- (ii) Recordkeeping shall be performed on a monthly basis documenting compliance with the 12 month rolling limits (the first 12 month period having been June 1, 1997 to May 31, 1998). The monthly recordkeeping for HAPs may be directly correlated to the VOC recordkeeping and the formula given above for VOC emission calculations. Fairchild Semiconductor shall keep a 12 month rolling total for each HAP emitted and total facility HAPs emitted based on purchase records, MSDS for the various materials used by the facility, and whether the HAP is controlled before being emitted to the atmosphere.

(23) Acid and Alkaline Emissions Sources

- (i) Fairchild Semiconductor shall operate wet scrubbers to control emissions from the acid and alkaline emission streams.
- (ii) The alkaline and acid vapor wet scrubbers shall be monitored using pH. The pH of the acid vapor scrubbing media shall be monitored at or above 8 and the pH of the alkaline vapor scrubbing media shall be maintained at or below 5. The pH shall be checked and recorded once per shift.
- (iii) A maintenance log shall be kept for each of the scrubbers. The log shall contain dates and reasons for all emission upsets as well as descriptions and dates of any maintenance, routine or otherwise, performed on the scrubbers.
- (iv) Visible emissions from each scrubber stack shall not exceed 20% opacity on a 6-minute block average basis except for no more than one 6-minute block average in a 1-hour period.

(24) Facility Wide Emissions

From fuel records, the following equations shall be used to determine compliance with the annual emission limits. Fairchild Semiconductor shall maintain monthly records documenting each pollutant for the 12-month rolling total. If the requirements for less than 99.9 tons/year of SO₂, NO_x and CO are being met, calculations show that PM emissions will also not exceed 99.9 tons/year and VOC emissions from fuel burning equipment will not exceed 15 tons/year.

SO₂

$$AD + \frac{[(0.141y)(s_2) + (0.0000006z)]}{2000} \leq 99.9 \text{ tons / year}$$

where:

AD = annual quantity (tons) of SO₂ from the operation of all generators =
sum of [(total hours of operation)(lb/hr limit)]/2000 for each unit;
y = annual quantity of #2 oil combusted (gallons) facility wide;
s₂ = average sulfur content by weight of #2 oil (percent);
z = annual quantity of natural gas combusted (cubic feet) facility wide.

NO_x

$$AD + \frac{[(0.042y) + (0.0000721z)]}{2000} \leq 99.9 \text{ tons / year}$$

where:

AD = annual quantity (tons) of NO_x from the operation of all generators
= sum of [(total hours of operation)(lb/hr limit)]/2000 for each
unit;
y = annual quantity of #2 oil combusted (gallons) in boilers;
z = annual quantity of natural gas combusted (cubic feet) in boilers.

CO

$$AD + \frac{[(0.005y)(s_2) + (0.000084z)]}{2000} \leq 99.9 \text{ tons / year}$$

where:

AD = annual quantity (tons) of CO from the operation of all generators =
sum of [(total hours of operation)(lb/hr limit)]/2000 for each unit;
y = annual quantity of #2 oil combusted (gallons) in total facility;
z = annual quantity of natural gas combusted (cubic feet) in total
facility.

(24) Parameter Monitors

Each parameter monitor must record accurate and reliable data. If the parameter monitor is recording accurate and reliable data less than 98% of the VOC Abatement Unit operating time within any quarter of the calendar year, the Department may initiate enforcement action and may include in that enforcement action any period of time that the parameter monitor was not recording accurate and reliable data during that quarter unless the licensee can demonstrate to the satisfaction of the Department that the failure of the system to record accurate and reliable data was due to the performance of established quality assurance and quality control procedures or unavoidable malfunctions.

The parameter monitor at Fairchild Semiconductor is the combustion temperature of the VOC Abatement Unit. For the purposes of this condition, a parameter monitor shall be considered to be operating if the monitor records two data points in one hour. Fairchild Semiconductor shall keep records of all periods of time that the VOC Abatement Unit is operating and the parameter monitor does not record at least two data points in one hour. This data shall be used to demonstrate

compliance with the requirement that the parameter monitors record 98% of the time the source is operating within any quarter of the calendar year.

- (25) Fairchild Semiconductor shall submit an application for an amendment prior to running Emergency Generators as Dispatchable Load Generators. The amendment will reflect this change and the hours of operation will be reduced from 500 to 250 hours per year (based on a 12 month rolling total).
- (26) Fairchild Semiconductor shall notify the Department within 48 hours and submit a report to the Department on a quarterly basis if a malfunction or breakdown in any component causes a violation of any emission standard (Title 38 MRSA §605-C).
- (27) Annual Emission Statement
In accordance with MEDEP Chapter 137, the licensee shall annually report to the Department by September 1, or other time specified by the Department, the information necessary to accurately update the State's emission inventory by means of:
 - (i) A computer program and accompanying instructions supplied by the Department; or
 - (ii) A written emission statement containing the information required in MEDEP Chapter 137.

Reports and questions should be directed to:

Attn: Criteria Emission Inventory Coordinator
Maine DEP
Bureau of Air Quality
17 State House Station
Augusta, ME 04333-0017

Phone: (207) 287-2437

- (28) Toxic Air Pollutants Emission Statement
In accordance with MEDEP Chapter 137, the licensee shall report, no later than September 1, every two years (1996, 1998, etc.) or in a timeframe designated by the Department, the information necessary to accurately update the State's toxic air pollutants emission inventory by means of a written emission statement containing the information required in MEDEP Chapter 137.
Reports and questions on the Air Toxics emissions inventory portion should be directed to:

Fairchild Semiconductor Corporation)
Cumberland County)
South Portland, Maine)
A-370-71-Q-R 21

Departmental
Findings of Fact and Order
Air Emission License

Attn: Toxics Inventory Coordinator
Maine DEP
Bureau of Air Quality
17 State House Station
Augusta, ME 04333-0017
Phone: (207) 287-2437

- (29) Fairchild Semiconductor shall pay the annual air emission license fee within 30 days of March 31 of each year. Pursuant to 38 MRSA §353-A, failure to pay this annual fee in the stated timeframe is sufficient grounds for revocation of the license under 38 MRSA §341-D, subsection 3.
- (30) The term of this Order shall be for five (5) years from the signature below.

DONE AND DATED IN AUGUSTA, MAINE THIS DAY OF 2003.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: _____
DAWN R. GALLAGHER, COMMISSIONER

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: May 30, 2002

Date of application acceptance: July 10, 2002

Date filed with the Board of Environmental Protection: _____

This Order prepared by Rachel E. Pilling, Bureau of Air Quality